

Level of depression and its associated factors among the frontline physicians of Bangladesh during the COVID-19 outbreak

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ABSTRACT

The COVID-19 pandemic has exposed the frontline physicians to a greater risk of getting infected, tremendous workload, and drastic changes in their work environment, leading to an increased prevalence of depression among doctors from many countries, including Bangladesh. The aim of this study was to examine the association of various personal, professional and psychosocial factors with different degrees of depressive symptoms among the frontline doctors of Bangladesh working during the COVID-19 pandemic. An online, cross-sectional survey was conducted for that purpose and data were collected from 312 doctors working in Bangladeshi hospitals using a self-administered survey questionnaire inclusive of a validated tool (Patient Health Questionnaire-9). Among the participants, around half were of age 30-34 years (51.3%), 81.8% worked in public hospitals and 70.5% did not have any comorbidity. Regarding workplace conditions, 77% of the doctors reported a perceived shortage of healthcare providers at their workplace, while 95% reported a perceived shortage of equipment, most commonly N95 masks (49%), gowns (35%), eye-protective shields (35%). A total of 199 (63.8%) participants received formal training since the beginning of the pandemic. According to the response from PHQ-9 questionnaire, 17 (5%) participants reported having no depression, while 18 (6%), 18 (6%), 25 (8%), and 234 (75%) reported having mild, moderate, moderately severe, and severe depression. Findings from multiple logistic regression showed the odds of moderate-to-severe depression to be higher among physicians with comorbidities (OR:7.47, CI: 1.27-43.89, P: 0.026) and those who felt extremely worried from looking at negative news on social/mass media (aOR: 15.180, CI:1.98-116.683, P: 0.009). To preserve and promote the psychological well-being of Bangladeshi doctors, it is, therefore, crucial to take these identified sources and risk factors of depression under sincere consideration by the responsible authorities and appropriate measures should be designed to remove these sources of depression to better support the physicians of the country.

Key words:

COVID-19; pandemics; physicians; Bangladesh; depression; mental health

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INTRODUCTION

The emergence of COVID-19 as the first pandemic of this century has been an unprecedented experience for many countries around the world. As of June 06, 2022, there has been a reported total of about 535.94 million confirmed coronavirus (SARS-CoV-2) cases globally including 6.3 million deaths.¹ COVID-19 disease was first reported in Asia and apart from the resultant death and morbidity ensuing from this pandemic, there is an abundance of evidence of the negative psychological impact of this pandemic among the people from the affected countries in this region as well as globally.² However, the burden of dealing with a pandemic of this extent has been evident to be even heavier for the low-and middle-income countries with vulnerable and ill-prepared health system.³ Bangladesh, being an overpopulated and economically disadvantaged Asian country with zero prior experience in dealing with a pandemic, was in a similar situation. Even before the pandemic, the resource-poor healthcare system of the country continually struggled to deal with common infectious diseases, let alone a pandemic.⁴ Therefore, its hospitals became quickly overwhelmed with a high volume of patients when they were hit by the COVID-19 pandemic. As of June 06, 2022, the reported number of confirmed cases and deaths due to the coronavirus in Bangladesh was around 1.95 million and 29,131 respectively.¹ Consequently, the frontline doctors of Bangladesh were drastically put in an extremely difficult position during this pandemic as they had no choice but to manage an increasing number of critically ill patients with very limited experience and resources.

Coping with the suddenly changing work environment (e.g., increased workload, altered work schedule) owing to

the emergence of the pandemic has been reported to increase the prevalence of psychological problems including stress, anxiety and depression globally among doctors.⁵ Hence, the possibilities are high that the Bangladeshi doctors being inexperienced in dealing with a pandemic of this nature have been struggling with similar mental health issues while working on the frontline of a pandemic.

Moreover, the health system of the country has always been heavily reliant on its doctors compared to other healthcare providers (HCPs) because of shortage and skill-mix imbalance issues in the health workforce.⁶ The scarcity of well-equipped facilities required for treating COVID-19 patients in Bangladesh has also become evident from the presence of only 0.72 ICU beds and 1.1 ventilators per 100,000 people.⁷ Such shortages caused overcrowding of the hospitals with a higher volume of COVID-19 patients and resulted in an increased workload for the doctors.⁴ Furthermore, they had to work in a confined environment with infected and dying patients everyday which likely put an immense strain on their mental health.⁸ Global evidence has exhibited that HCPs working directly with COVID-19 patients showed a higher risk of developing depression, anxiety and other psychological problems.^{9,10} Moreover, several studies have reported that the burden and stress of working on the frontline of the pandemic coupled with the absence of needed mental health support during such a catastrophic event can lead to a high prevalence of depression among doctors. It has been evident that suffering from depression leads to the loss of working spirit and productivity which on occasion prompted the affected doctors to even leave their jobs as they felt psychologically incapacitated to carry on with their daily activities.¹¹⁻¹⁵ It is therefore crucial to assess the mental health status of the frontline doctors of

Bangladesh in order to evaluate if they are suffering from any symptoms of depression following the emergence of COVID-19 pandemic, and if yes, then the reason behind such occurrences need to be identified as well.

With that aim, this study was conducted to understand the extent of depression among Bangladeshi physicians during the COVID-19 pandemic and to identify specific sources of depression. The findings from this study will help inform the government and policy makers and develop effective and targeted programs to address the occurrence and severity of depressive symptoms among doctors in the country.

METHODOLOGY

Study design, duration and setting

A cross-sectional survey was conducted online between May,2020 and July,2020 among physicians working in various types and levels of hospitals in Bangladesh. The survey questionnaire was developed in Google Forms and disseminated among the acquaintances of the researchers via social networks such as Facebook, Messenger and WhatsApp. During the dissemination of the questionnaire, Bangladeshi medical graduates with at least an MBBS (Bachelor of Medicine and Surgery) degree, who were actively providing healthcare services during the survey, irrespective of their duty station were considered. Participants who did not complete the questionnaire and/or did not provide consent were excluded from the analysis. Ethical approval for the survey was obtained from the Institutional Review Board of the Institute of Health Economics, University of Dhaka, Bangladesh (IHEirb-120520).

Sample Size

We calculated sample size *a priori*, using a formula described elsewhere¹⁶, aiming to detect 25% prevalence of

depression among the doctors of Bangladesh due to the COVID-19 pandemic. We decided on this prevalence after consulting a number of publications that reported a wide range of prevalence (13%-35%).^{17,18} Our calculation gave us a sample size of 288.12 or 289. In addition, 10% non-response rate was considered, making the total sample size for our study to be 317.

Survey Questionnaire

The questionnaire was broadly divided into five sections for collecting information on the potential sources causing depression among Bangladeshi doctors as a result of the COVID-19 pandemic. The sections were as follows: a) demographic and occupational characteristics of participants including age, sex, clinical experience, current discipline and designation, nature and level of current workplace, number of family members, and co-morbidities. b) workplace and personal level of preparedness of the physicians during the pandemic, c) knowledge, attitude, practice, and perception regarding the COVID-19 pandemic d) experience regarding social stigma and receipt of support (financial and psychological) from the workplace, and e) presence and severity of depression using Patient Health Questionnaire-9 (PHQ-9). The PHQ-9 questionnaire, containing 9 items, is considered to provide excellent reliability and validity, sensitivity and specificity of 88% for major depression¹⁹. Each item in the PHQ-9 questionnaire is designed to be rated on a 4-point scale of "0" (not at all) to "3" (nearly every day). A cutoff score of ≥ 10 is considered to be an indicator of depression. The scores of the participants were classified into five groups: minimal (less than 5), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (more than 20) depression.

Data Analysis

We used SPSS version 20.0 for data processing and analysis. Descriptive statistics were calculated as proportion for categorical variables and their frequency and proportion were presented. Chi-square tests were done to identify statistically significant difference in proportions between groups with no/mild depression and moderate to severe depression with the significance level set at $p < 0.05$. Variables that showed significant association with depression in bivariate analysis were entered in multiple logistic regression to develop a model for predicting factors associated with depression. Adjusted odds ratio (aOR) was calculated with 95% confidence interval (CI).

RESULT

Characteristics of Study Participants

There was a total of 312 completed surveys received from the eligible respondents. **Table 1** demonstrates sociodemographic characteristics and workplace related information of the participant doctors. Majority of the participants were male (64.7%) working at different levels of healthcare facilities across Bangladesh. A higher proportion of the participants were working in public healthcare facilities (81.8%). Most participants (70.5%) did not have any comorbidities while 16% had lung disease, 6.1% had cardiovascular disease and 4.2% had diabetes.

Table 1. Characteristics of participants (N=312)

Variables	Categories	N (%)
Age	Less than 25 years	1(0.3)
	25-29 years	132 (42.3)
	30-34 years	160 (51.3)
	35-39 years	12 (3.8)
	40 years and above	7 (2.2)
Sex	Female	110 (35.3)
	Male	202 (64.7)
Years of clinical experience	<2 years	41 (13.1)
	2-5 years	154 (49.4)
	6-10 years	103 (33.0)
	> 10 years	14 (4.5)
Nature of workplace	Public	254 (81.8)
	Private	58 (18.6)
Level of workplace	Primary	125 (40.1)
	Secondary	36 (11.5)
	Tertiary	151 (48.4)
Comorbidity	None	220 (70.5)
	Diabetes	13 (4.2)
	Cardiovascular diseases	19 (6.1)
	Lung disease (Asthma, COPD etc.)	50 (16.0)
	Kidney disease	1 (0.3)
	Cancer	2 (0.6)
	Pregnancy	5 (1.6)

Workplace and Personal Preparedness

Information regarding the level of personal and workplace preparedness of participants is shown in Table 2. Majority (76.9%) of participants reported shortages of healthcare professionals and support staff at their healthcare facilities with the shortage of medical technologists being the most common (62.2%). The rest pointed out the issue of one or more of the following equipment shortages at their workplace: N95 respirators (49%), disinfectants and sanitizers (55.4%), drugs for COVID-19 treatment (31.4%), oxygen cylinders (50%) and laboratory equipment to diagnose COVID-19 (56.1%). Respectively 90.7% and 70.2% of the participants felt that their workplace environment was unsafe and

unprepared to deal with the COVID-19 outbreak.

Prior to the COVID-19 outbreak, majority (88.5%) of our participants never received any form of formal epidemic or pandemic preparedness/management training. Among those who received some form of training following the beginning of COVID-19, only 6.56% and 28.6% felt confident about the use of PPE and COVID-19 patient management respectively. Doctors receiving PPE (n=305) from the workplace were mostly dissatisfied with the quality of gown (70.5%) and mask (86.9%) and with the timeliness (79.3%) and adequacy (72.8%) of the PPE received. The workplace of nearly 85% of respondents also lacked a standard PPE donning-doffing zone.

Table 2. Workplace and personal preparedness related information

Variables	Categories	N (%)
HCP shortage (perceived)	No shortage of healthcare professional	41 (13.1)
	Doctor	151 (48.4)
	Nurse	147 (47.1)
	Medical technologists/Lab technologist	194 (62.2)
	4 th class employee	42 (13.5)
	Don't know	32 (10.3)
Equipment shortage (perceived)	No shortage of equipment	17 (5.4)
	N95	153 (49.0)
	Medical Mask	90 (28.8)
	Gown	108 (34.6)
	Gloves	90 (28.8)
	Eye protection	109 (34.9)
	Personal Protective Equipment (PPE)	99 (31.7)
	Laboratory equipment to diagnose COVID-19	175 (56.1)
	Oxygen cylinders	156 (50.0)
	Ambulance	72 (23.1)
	Disinfectants and sanitizers	173 (55.4)
	Medicine	98 (31.4)
Proportion of participants working in hospital with safety practices	Separated COVID and non-COVID zone	132 (42.3)
	Separated COVID and non-COVID team	0 (0.0)
	Strict movement between COVID and non-COVID zone	72 (23.1)
	Use of glass/plastic screens to protect physicians	109 (34.9)
Hospital environment	Safe	29 (9.3)
	Unsafe	283 (90.7)

Variables	Categories	N (%)
Hospital preparedness	Prepared	93 (29.8)
	Unprepared	219 (70.2)
Training received after pandemic	Received	199 (63.8)
	Have not received	113 (36.2)
Training received before pandemic	Received	29 (9.3)
	Have not received	276 (88.5)
	Don't remember	7 (2.2)
Participants confident about proper use of PPE after training (N=199)	Yes	104 (52.3)
	No	13 (6.56)
	Unsure	82 (41.2)
Participants confident about management of COVID-19 cases after training (N=199)	Yes	57 (28.6)
	No	33 (16.6)
	Unsure	109 (54.8)
Satisfaction with PPE adequacy (N=305)	Satisfied	80 (25.6)
	Unsatisfied	222 (72.8)
	Unsure	3 (1.0)
Satisfaction with Mask quality (N=305)	Satisfied	30 (9.8)
	Unsatisfied	271 (86.9)
	Unsure	4 (1.3)
Satisfaction with Gown quality (N=305)	Satisfied	82 (26.9)
	Unsatisfied	215 (70.5)
	Unsure	8 (2.6)
Satisfaction with PPE timeliness (N=305)	Satisfied	61 (20.0)
	Unsatisfied	242 (79.3)
	Unsure	2 (0.7)
PPE changing facility	Available	47 (15.1)
	Not available	265 (84.9)

COVID-19 Related Knowledge, Attitude and Perception

Table 3 shows the participants' knowledge regarding the standard protective equipment and measures against COVID-19 along with their attitude and perception towards the risk of working in a COVID-19 dedicated hospital (compared to working in a non-COVID hospital); their

level of anxiety towards the risk of contracting COVID-19 by themselves or by their family members, towards the negative impact of social media news; their experience of being exposed to harassments during the pandemic; and their perception of support for family and that received from the workplace.

Table 3. Knowledge, attitude and perception regarding COVID-19

Variables	Categories	N (%)
Knowledge about standard components of PPE	Adequate	191 (61.2)
	Inadequate	121 (38.8)
Knowledge about patient protection	Adequate	222 (71.2)
	Inadequate	90 (28.8)
Knowledge about self-protection	Adequate	146 (46.8)
	Inadequate	166 (53.2)
Knowledge regarding AGP related safety measures	Adequate	253 (81.1)
	Inadequate	59 (18.9)
Anxiety about contracting COVID-19	Not worried	6 (1.9)
	Somewhat/Moderately worried	89 (28.5)
	Severe/Extremely worried	217 (69.6)
Anxiety about infecting family members	Not worried	7 (2.2)
	Somewhat/Moderately worried	57 (18.3)
	Severe/Extremely worried	248 (79.5)
Anxiety about social media news	Not worried	10 (3.2)
	Somewhat/Moderately worried	117 (37.5)
	Severe/Extremely worried	185 (59.3)
Harassed during pandemic	Yes	124 (39.7)
	No	188 (60.3)
Received financial/similar support from workplace	No support	255 (81.7)
	Received supports	57 (18.3)
Perception of risk/benefit for COVID-19 duties (N=225)	More risk, more benefit at dedicated hospitals	49 (21.8)
	Similar risk, more benefit at dedicated hospitals	160 (71.1)
	More risk, similar benefit at dedicated hospitals	1 (0.4)
	Similar risk, similar benefit at dedicated hospitals	15 (6.7)

Prevalence of Depression and Associated Factors

Based on the self-reported responses of the participants recorded via the PHQ-9 questionnaire, only 17 participants reported no/minimal depression (5.4%), 18 (5.8%) reported mild depression, 18 reported moderate depression (5.8%), 25 (8.0%) reported moderately severe depression and the rest (n=234, 75%) reported severe depression. **Table 4** presents the factors which were found to be associated with the causation of depressive symptoms among our participants. The prevalence of moderate/severe depression was

significantly higher among those with a comorbidity (OR: 3.60, 95% CI: 1.24-10.54, P: 0.019); whose workplace had HCP shortages (OR:2.65, CI: 1.14-6.16, P: 0.023), and lower among those who had knowledge regarding the protective measures required for physicians during aerosol generating procedures/AGP (OR: 0.11, CI: 0.02-0.83, P: 0.032).

Subsequently, multiple logistic regression was performed to establish a model to understand the independent risk factors responsible for depression among the doctors of Bangladesh. After controlling for the effect of non-significant variables, the odds of depression were

found to be higher among physicians who had any form of comorbidities and who felt

extremely worried from looking at negative news on social/mass media (See Table 5).

Table 4. Factors associated with depression

Variables and categories	No/Mild Depression n (%)	Moderate/Severe Depression n (%)	OR (95% CI)	P value
Age				
Below 30 years	12 (9.0)	121 (91.0)	1.0	
30 years or more	23 (12.8)	156 (87.2)	0.67 (0.32-1.41)	0.292
Sex				
Male	27 (13.4)	175 (86.6)	0.51 (0.22-1.61)	0.108
Female	8 (7.3)	102 (92.7)	1.0	
Clinical Experience				
5 years or less	20 (10.3)	175 (89.7)	1.0	
More than 5 years	15 (12.8)	102 (87.2)	0.78 (0.38-1.59)	0.488
Family members				
5 members or less	21 (10.2)	185 (89.8)	1.0	
More than 5 members	14 (13.2)	92 (86.8)	0.75 (0.36-1.53)	0.426
Nature of workplace				
Public	29 (11.4)	225 (88.6)	1.0	
Private	6 (10.3)	52 (89.7)	1.12 (0.44-2.83)	0.815
Level of workplace				
Primary	15 (12.8)	102 (87.2)	1.0	
Secondary	5 (15.2)	28 (84.8)	0.82 (0.28-2.46)	0.728
Tertiary	13 (9.0)	132 (91.0)	1.49 (0.68-3.28)	0.318
Private Others	2 (11.8)	15 (88.2)	1.10 (0.23-5.31)	0.903
Comorbidities				
Yes	4 (4.3)	88 (95.7)	3.60 (1.24-10.54)	0.019
No	31 (14.1)	189 (85.9)	1.0	
Shortage of HCP				
No shortage present	9 (22.0)	32 (78.0)	1.0	
Shortage present	26 (9.6)	245 (90.4)	2.65 (1.14-6.16)	0.023
Shortage of equipment				
No shortage present	3 (17.6)	14 (82.4)	1.0	
Shortage present	32 (10.8)	263 (89.2)	1.76 (0.48-6.46)	0.393
Hospital environment				0.115
Safe	6 (20.7)	23 (79.3)	1.0	
Unsafe	29 (10.2)	254 (89.8)	2.29 (0.86-6.07)	0.097
Hospital preparedness				0.846
Prepared	11 (11.8)	82 (88.2)	1.0	
Unprepared	24 (11.0)	195 (89.0)	1.09 (0.51-2.32)	0.824
Training received				
Yes	26 (13.1)	173 (86.9)	1.0	

Variables and categories	No/Mild Depression n (%)	Moderate/Severe Depression n (%)	OR (95% CI)	P value
No	9 (8.0)	104 (92.0)	1.74 (0.78-3.85)	0.174
Participants confident about proper use of PPE (post-training) (N=199)				
No	3 (23.1)	10 (76.9)	1.0	
Yes	18 (17.3)	86 (82.7)	1.43 (0.36-5.74)	0.611
Unsure	5 (6.1)	77 (93.9)	4.62 (0.96-22.33)	0.057
Participants confident about COVID-19 management (post-training) (N=199)				
No	2 (6.1)	31 (93.9)	1.0	
Yes	14 (24.6)	43 (75.4)	0.20 (0.04-0.94)	0.041
Unsure	10 (9.2)	99 (90.8)	0.64 (0.13-3.07)	0.576
Knowledge about standard PPE components				
Adequate	24 (12.6)	167 (87.4)	1.0	
Inadequate	11 (9.1)	110 (90.9)	1.48 (0.68-3.05)	0.345
Satisfaction with PPE timeliness (N=305)				
Unsatisfied/Unsure	27 (11.1)	217 (88.9)	1.0	
Satisfied	7 (11.5)	54 (88.5)	0.96 (0.40-2.32)	0.928
Satisfaction with PPE adequacy (N=305)				
Unsatisfied/Unsure	24 (10.7)	201 (89.3)	1.0	
Satisfied	10 (12.5)	70 (87.5)	0.84 (0.38-1.84)	0.655
Satisfaction with Mask quality (N=305)				0.354
Unsatisfied/Unsure	29 (10.5)	246 (89.5)	1.0	
Satisfied	5 (16.7)	25 (83.3)	0.59 (0.21-1.66)	0.317
Satisfaction with Gown quality (N=305)				0.687
Unsatisfied/Unsure	24 (10.8)	199 (89.2)	1.0	
Satisfied	10 (12.2)	72 (87.8)	0.87 (0.40-1.91)	0.725
PPE changing facility				
Available	7 (14.9)	40 (85.1)	0.68 (0.28-1.65)	0.389
Not available	28 (10.6)	237 (89.4)	1.0	
Knowledge about patient protection				
Adequate	27 (12.2)	195 (87.8)	0.71 (0.31-1.62)	0.408
Inadequate	8 (8.9)	82 (91.1)	1.0	
Knowledge about self-protection				
Adequate	19 (13.0)	127 (87.0)	0.71 (0.35-1.44)	0.347
Inadequate	16 (9.6)	150 (90.4)	1.0	
Knowledge regarding AGP related safety measures				
Adequate	34 (13.4)	219 (86.6)	0.11 (0.02-0.83)	0.032
Inadequate	1 (1.7)	58 (98.3)	1.0	
Anxiety about contacting COVID-19				
Not worried	1 (16.7)	5 (83.3)	1.0	
Somewhat/Moderately worried	20 (22.5)	69 (77.5)	0.69 (0.08-6.25)	0.741
Severe/Extremely worried	14 (6.5)	203 (93.5)	2.9 (0.32-26.55)	0.346

Variables and categories	No/Mild Depression n (%)	Moderate/Severe Depression n (%)	OR (95% CI)	P value
Anxiety about infecting family members				
Not worried	1 (14.3)	6 (85.7)	1.0	
Somewhat/Moderately worried	14 (24.6)	43 (75.4)	0.51 (0.06-4.63)	0.551
Severe/Extremely worried	20 (8.1)	228 (91.9)	1.90 (0.22-16.57)	0.561
Anxiety about social media news				
Not worried	5 (50.0)	5 (50.0)	1.0	
Somewhat/Moderately worried	22 (18.8)	95 (81.2)	4.32 (1.15-16322)	0.030
Severe/Extremely worried	8 (4.3)	177 (95.7)	22.13 (5.31-92.25)	<0.001
Harassed during pandemic				
Yes	12 (9.7)	112 (90.3)	1.30 (0.62-2.72)	0.485
No	23 (12.2)	165 (87.8)	1.0	
Received financial/similar support from workplace				
No support	32 (12.5)	223 (87.5)	1.0	
Received support	3 (5.3)	54 (94.7)	2.58 (0.76-8.75)	0.127

(OR= Odds Ratio; CI: Confidence Interval)

Table 5. Multivariate analysis of factors associated with depression

Variables	aOR (95% CI)	P value
Comorbidity		
Comorbidity absent	1.0	
Comorbidity present	7.47 (1.27-43.89)	0.026
Anxiety about social media news		
Not worried	1.0	
Somewhat/Moderately worried	4.20 (0.72-24.72)	0.111
Severe/Extremely worried	15.180 (1.98-116.683)	0.009

(aOR= Adjusted Odds Ratio; CI: Confidence Interval)

DISCUSSION

The current study reported that the majority of our participant physicians were suffering from some form of depression during the early phases of the COVID-19 pandemic. Similar mental health problems resulting from this pandemic have been reported among the HCPs of several other countries as well. For instance, a study

conducted across five countries of the Asia-Pacific region showed that irrespective of the patient load, healthcare workers providing services during the pandemic were suffering from various forms of psychological problems including depression, especially those who had no prior training or had a comorbid condition. Other studies pointed out challenges like long working hours, lack of personal

protective equipment, dealing with the escalating mortality of the patients and working in a confined and panic-ridden hospital environment while being isolated from their families for a long period of time acted as some key stressors for the healthcare professionals which affected their mental health to a great extent.²⁰⁻²⁶

Evidence from various studies also revealed that compared to the general public, healthcare workers have been seen to be more negatively affected psychologically during this pandemic.²⁷ A Turkish study reported that healthcare professionals were more adversely affected by the pandemic compared to others in the country.²⁸ A study on adult Bangladeshi population during COVID-19 found that around 58% of the participants had depressive symptoms,²⁹ which is lower than the prevalence we found among our participant doctors. Some key reasons behind this higher prevalence of mental health issues among doctors could be working in a highly stressful and constrained hospital environment, being fearful of getting infected due to close contact with patients, and longer working hours.^{13,30,31} Two consequent study findings from Egypt also revealed a higher burden of depression among their healthcare workers during the initial period of the pandemic, which were 94% and 77% respectively.^{11,12} Findings from two Sri Lankan and Chinese studies revealed that around 54% and 51% of their healthcare professionals were experiencing elevated depressive symptoms during the pandemic respectively.^{14,13} In contrast, two cross-sectional surveys from Nepal and Indonesia reported that 38 % and 23% of their healthcare workers on COVID-19 duty were suffering from depression and/or anxiety.^{32,33}

The difference in the rates of depression between various studies can be attributed to the differences in characteristics and level of preparedness of different healthcare systems; variations in

the time of conducting the survey; prior experiences of healthcare providers/the country in dealing with similar infectious disease outbreaks; and dissimilarities in the socio-demographic profiles of the participants.^{14,34,35} For Bangladeshi doctors, along with the unpreparedness and ill-equipped conditions of their healthcare facilities, the higher rate of depression can also be attributed to the severe shortage and skill-mix imbalance issues in the health workforce of the country. There are reportedly only 4 physicians and 7.7 hospital beds per 10,000 population in Bangladesh whereas WHO recommends having at least 23 physicians and 30 beds per 10,000 population in a country. Additionally, the doctor-nurse-technician ratio in the country is 1: 0.4: 0.24, which is in contrast with the WHO recommended ratio of 1:3:5.^{6,36} During the COVID-19 pandemic, there were also evident inadequacies of COVID testing facilities, oxygen supply, ventilators and ICU units at the hospitals, which must have made it harder for the doctors to do their job and increased their psychological burden in due process. Our study corroborates these assumptions, as our respondents whose workplaces had a shortage of HCPs and hospital equipment were seen as more likely to be depressed compared to others.

Our findings have shown a significant association of developing depressive symptoms among doctors who had existing comorbidities as comorbid persons run a higher risk of worsened outcome if infected with coronavirus,³⁷ and having this knowledge might have prompted the depressive symptoms among our participants with comorbidities. Another Bangladeshi study conducted on older populations reported the same, as the respondents with pre-existing comorbidities exhibited 91% higher odds of depressive symptoms than others.³⁸ Other than that, looking at negative social media/mass media news has been found to increase the severity of depression,

according to our data. Another study conducted among the Bangladeshi population has also found a significant association between mental health problems and a person's daily exposure to COVID-19 related news.³⁹ There is other corroborating evidence that showed the likelihood of developing psychiatric issues among those who are more exposed to COVID-19 related news and incidents.^{40,41} Participants who were anxious and worried about contracting the COVID-19 virus themselves or by their family members also exhibited a higher prevalence of moderate/severe depression in our study which is similar to Pakistani study findings.⁴² Several other studies also reported that doctors who work with infected patients tend to have a higher prevalence of depression and anxiety.⁴³⁻⁴⁵ Majority of our respondents reported having an unsafe work environment, and lack of access to adequate and quality PPE, which might have incited their fear of getting infected from the workplace. This could cause depression among doctors as previous studies have reported a higher risk of developing psychological disorders among HCWs who experience inadequacy of PPE, extreme workload, social isolation and fear of contracting the infection.^{46,47} Furthermore, not having any training or knowledge on how to deal with a public health emergency like this could create enormous psychological pressure for them.

In the wake of the pandemic, many government doctors were redeployed from their original workplace to the newly established 'dedicated' COVID-19 hospitals, and a stark difference in work environment was reported among the dedicated and non-dedicated hospitals by our participants. Doctors working at those dedicated hospitals reportedly received more training on the COVID-19 pandemic and these hospitals had stricter safety measures, adequate supply of PPE for their

HCPs and protocols to admit confirmed COVID-19 cases only, which were unavailable in the 'non-dedicated' hospitals in most cases. Hence, participants working in 'non-dedicated' facilities were concerned about such lack of safety and preparedness at their workplaces, and many felt that they were at more risk of contracting the virus because of these issues.

Overall, the lack of safe working environment and adequate training, shortage of HCPs and standard PPE, extended working hours, being separated from their families for a longer period, and fear for their family members being affected by the disease were the most commonly reported challenges by our participants which caused them immense physical and psychological strain. Not receiving any proper mental health support under such circumstances also made it harder for our participants to cope with their personal and professional struggles during this period of the pandemic which may have contributed to the higher prevalence of severe depressive symptoms among our participant doctors.

However, it should be mentioned that our study has certain limitations. For instance, the study participants were selected by convenience sampling making its generalizability limited. Also, the study was conducted using an online self-administered questionnaire which may cause response bias and the self-reported symptoms may not be consistent with the actual clinical diagnosis. In order to get a more accurate psychiatric diagnosis, structured clinical interviews and functional neuroimaging should be applied through face-to-face interviews in the future, if the situation permits⁴⁸⁻⁵⁰. Another weakness of our study is that we did not specifically explore and differentiate between the level of depression among physicians across various clinical and non-

clinical disciplines, which can be different as observed in previous studies.⁵¹ Nevertheless, considering the countrywide lockdown, social isolation protocols, and the extremely busy schedule of the physicians, this online survey was the best possible approach for us at the time to collect data on this highly important topic. Furthermore, the data for the online survey were collected using globally validated standardized tools like PHQ-9 for the quantitative analysis. Hence, we believe that our study has provided some insightful information on the topic in question which should be taken into consideration by the government and policy makers of Bangladesh health sector.

Considering how the COVID-19 pandemic has put an enormous strain on the mental health of Bangladeshi physicians which has been evident through the higher prevalence of depressive symptoms found among our participants, we recommend that robust and effective measures should be taken promptly to support the psychological well-being of the frontline physicians of Bangladesh by their government and responsible authorities. Accordingly, the hospitals as well as the entire health system of the country need to be strengthened and reformed in a way that will allow their physicians to do their job with efficiency and comfort. For instance, to tackle the shortage of healthcare professionals during an unprecedented event like the COVID-19 pandemic, medical students and grassroot level healthcare workers can be trained in epidemic and pandemic management so that they can be deployed to support the core health workforce of the country in the event of a public health crisis.⁵²⁻⁵⁵ In addition, proper incentives and compensation packages should be designed for the physicians as a rewarding mechanism for their services to help lift their morale and make them feel valued for their contribution. Finally, structured and targeted psychosocial support programs

should be established for the physicians working in both dedicated and non-dedicated COVID-19 hospitals to protect and promote their mental health at all times. In this regard, making provision of professional psychological counselling services for the doctors at their workplace and the use of cognitive behavioral therapy programs can be considered as they have been found to be effective in dealing with psychological issues among affected people in various setups.⁵⁶⁻⁵⁸

CONCLUSION

We found a high level of depression among our respondents which was found to be associated with the workplace associated stress and burnout experienced by the physicians, their health conditions (e.g., presence of comorbidities), and the negative impact of social/mass media on their psyche. If these issues are not managed carefully, there is a high probability that the prevalence and severity of depression among Bangladeshi physicians will continue to increase. Therefore, to maintain the psychological well-being of the physicians and to prepare them mentally to tackle a pandemic of this nature in the future, targeted measures and interventions need to be taken by the responsible authorities of the country with utmost importance and urgency.

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